

REC'D 23 FEB 2005

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT



(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 1433 WO	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/EP 02/13850	International filing date (day/month/year) 06.12.2002	Priority date (day/month/year) 06.12.2002
International Patent Classification (IPC) or both national classification and IPC C30B15/10		
Applicant VESUVIUS FRANCE S.A. et al.		

- This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
- This REPORT consists of a total of 5 sheets, including this cover sheet.
 - ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 1 sheets.

- This report contains indications relating to the following items:
 - I ☒ Basis of the opinion
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☐ Certain defects in the international application
 - VIII ☐ Certain observations on the international application

Date of submission of the demand 12.05.2004	Date of completion of this report 23.02.2005
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Cook, S Telephone No. +31 70 340-3372 

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/EP 02/13850**

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*):

Description, Pages

1-7 as originally filed

Claims, Numbers

1-7 received on 08.12.2004 with letter of 08.12.2004

Drawings, Sheets

1/1 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-7
	No: Claims	
Inventive step (IS)	Yes: Claims	1-7
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-7
	No: Claims	

2. Citations and explanations

see separate sheet

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Re Item V

**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

Reference is made to the following document:

**D1: "ABSTRACTS + INDEXES, AMERICAN CHEMICAL SOCIETY. COLUMBUS, US" CHEMICAL
ABSTRACTS + INDEXES, AMERICAN CHEMICAL SOCIETY. COLUMBUS, US, vol. 105, no.
4, 28 July 1986 (1986-07-28), XP000185916 ISSN: 0009-2258**

Novelty

No single prior art document in the international search report discloses a vessel comprising the silicon composite thermet sprayed coating having the claimed ternary composition of metal silicon:silicon nitride:silicon oxide and in the range specified in claim 1. The method, as set out in claim 6, to produce this vessel is not taught either in the prior art. The present application therefore meets the criteria of Article 33(1) PCT, because the subject-matter of claims 1-7 is new in the sense of Article 33(2) PCT.

Inventive step

The application addresses the problem of finding coatings for silicon holding vessels which protect molten silicon from contamination arising from contact with the material of the holding vessel (crucible). Prior art coatings involving oxides and nitrides are inadequate from the point of view of mechanical properties due to poor sinterability. The solution proposed by the application is to include silicon metal in a specific ratio range in a mixture containing silicon nitride and silicon oxides which is applied as a thermet coating to the interior wall of the holding vessel. D1, considered as the closest prior art, teaches using a "releasing-agent layer" comprising a layer of Si_3N_4 , SiO_2 , SiO or BN mixed with Si. D1 does not suggest the specific ternary composition and range presently claimed. The applicant has shown that specific technical effects (binding strength, coating strength, wettability) are achieved by this ternary composition. Since this composition nor the achieved effects are suggested in D1 or other prior art documents, the subject matter of claim 1 and the corresponding method claim 6 is not considered to be obvious. The present application thus meets the criteria of Article 33(1) PCT, because the subject-matter of claims 1-7 involves an inventive step in the sense of Article 33(3) PCT.

Industrial applicability

The claimed subject matter is considered to be industrially applicable and thus fulfilling the

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requirements of Article 33(4) PCT.